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Zhao et al.

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COMPOUNDS, COMPOSITIONS AND PREPARATION METHOD THEREOF

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(56) References Cited

U.S. PATENT DOCUMENTS

3,903,322	Α	9/1975	Ravve et al.
4,980,510	A	12/1990	Hagemann et al.
5,932,731	A	8/1999	Goda et al.
6,291,433	B1	9/2001	Barberousse et al.
7,166,647	B2	1/2007	Herlihy et al.
9,061,979	B2	6/2015	Zhao
2004/0049972	A1*	3/2004	Husemann C08F 2/38
			44/358
2008/0132601	A1	6/2008	Hoyle et al.

FOREIGN PATENT DOCUMENTS

CN	1599713	3/2005
CN	101153037	4/2006
CN	1887913	1/2007
CN	101121660	2/2008
CN	101153037	4/2008
CN	101172951	5/2008
CN	101434534	5/2009
CN	101434534 A	5/2009
CN	101434543	5/2009
CN	101434543 A	5/2009
CN	101831176 A	9/2010
EP	1 845 122 A1	10/2007

(Continued) OTHER PUBLICATIONS

First Office Action Notice issued in CN application No. 201180011842.1, mailed Aug. 8, 2013.

Second Office Action Notice issued in CN application No. 201180011842.1, mailed Nov. 4, 2013.

Notice of Grant issued in CN application No. 201180011842, mailed Feb. 14, 2014.

Effect of New Photoinitiator on the Courses of Photochemical Reactions in Poly (Vinyl Chloride), Halina Kaczmarek et al., Polimery 2009, 54, nr. 3, pp. 202-208.

Photoinitiated Crosslinking of Multifunctional Unsaturated Cycloacetal Polythiol System, Li Miao-Zhen et al., May 1991, vol. 9, No. 2, "Photographic Science and Photochemistry," pp. 112-119 (with English abstract).

(Continued)

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(57) ABSTRACT

The present invention provides a photocurable composition prepared using mercapto benzophenone compounds as key raw materials. The present invention aims to solve the problems existing in the prior photo-curing technology that low-molecular photoinitiators are easy to remain and migrate, while macromolecular photoinitiators has low initiation efficiency due to a low content of effective components and also has the problem of certain migration. The photocurable composition in the present invention can be easily prepared and has high addition efficiency with ethylenically unsaturated compounds, and the photocurable composition obtained by addition has no residual mercapto and has features of high initiation activity and zero migration rates when it is used in photocurable coatings, binder and ink formula.

7 Claims, No Drawings